# Claims

WHAT IS CLAIMED IS:

1. A method comprising:

evaluating network capacity available for communications between a first node and a second node based on transfer data received by the second node from the first node within a specified receive window during a specified control interval; and

generating an adjusted receive window size for a subsequent control interval based on evaluated availability of the network capacity in the specified control interval.

2. The method of claim 1 further comprising:

communicating the adjusted receive window size to the first node to instruct the first node to transmit to the second node in accordance with the adjusted receive window size in the subsequent control interval.

3. The method of claim 1 wherein the operation of generating comprises:

adjusting a receive buffer size at the second node at an application level to generate the adjusted window size in the subsequent control interval.

4. The method of claim 1 wherein the operation of generating comprises:

adjusting a receive buffer size at the second node to generate the adjusted window size in the subsequent control interval.

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5. The method of claim 1 wherein the operation of generating comprises:

applying the adjusted window size to a transport level of the receive node in the subsequent control interval.

6. The method of claim 1 wherein the operation of generating comprises:

applying the adjusted window size to a transport level of the receive node in the subsequent control interval.

7. The method of claim 1 further comprising:

communicating the adjusted receive window size to the first node to instruct the first node to adjust a send window size in accordance with the receive window and to transmit to the second node in accordance with the adjusted receive window size in the subsequent control interval.

8. The method of claim 1 wherein the operation of evaluating comprises:

detecting a loss of the transfer data received by the second node during the specified control interval, relative to the specified receive window.

9. The method of claim 1 wherein the operation of evaluating comprises:

measuring an amount of the transfer data received by the second node during the specified control interval.

10. The method of claim 1, wherein the operation of generating comprises:

determining whether to increase or decrease the receive window to obtain the adjusted receive window size; and

determining an amount by which to adjust the receive window to obtain the adjusted receive window size.

11. The method of claim 1 wherein the operation of generating comprises:

determining an amount by which to adjust the receive window using a binary search to obtain the adjusted receive window size.

12. The method of claim 1 wherein the operation of generating comprises:

determining an amount by which to adjust the receive window using a stochastic approximation to obtain the adjusted receive window size.

13. The method of claim 1 wherein the operation of generating comprises:

evaluating a measured amount of the transfer data received by the receiver node during the specified control interval relative to the specified received window size to determine a slope for the specified control interval; and

testing the slope for the specified control interval against an estimate of a constant slope associated with additional available network capacity in at least one previous control interval.

14. The method of claim 1 wherein the operation of generating comprises:

evaluating a measured amount of the transfer data received by the receiver node during the specified control interval relative to the specified received window size to determine a slope for the specified control interval; and

testing the slope for the specified control interval against an estimate of a constant slope associated with additional available network capacity in at least one previous control interval in the presence of a measurement noise threshold.

15. The method of claim 1 wherein the operation of generating comprises:

evaluating a measured amount of the transfer data received by the receiver node during the specified control interval relative to the specified received window size to determine a slope for the specified control interval; and

testing the slope for the specified control interval against an estimate of a constant slope associated with additional available network capacity in at least one previous control interval, wherein the estimate of the constant slope represents a weighted average of at least one previous slopes associated with at least one previous control interval in which the previous slope exceeds or equals a previous estimate of the constant slope.

16. The method of claim 1 wherein the operations of evaluating and generating are performed at the application level.

17. A computer program product encoding a computer program for executing on a computer system a computer process, the computer process comprising:

evaluating network capacity available for communications between a first node and a second node based on transfer data received by the second node from the first node within a specified receive window during a specified control interval; and

generating an adjusted receive window size for a subsequent control interval based on evaluated availability of the network capacity in the specified control interval.

18. The computer program product of claim 17 wherein the computer process further comprises:

communicating the adjusted receive window size to the first node to instruct the first node to transmit to the second node in accordance with the adjusted receive window size in the subsequent control interval.

19. The computer program product of claim 17 wherein the operation of generating comprises:

adjusting a receive buffer size at the second node at an application level to generate the adjusted window size in the subsequent control interval.

20. The computer program product of claim 17 wherein the operation of generating comprises:

adjusting a receive buffer size at the second node to generate the adjusted window size in the subsequent control interval.

21. The computer program product of claim 17 wherein the operation of generating comprises:

applying the adjusted window size to a transport level of the receive node in the subsequent control interval.

22. The computer program product of claim 17 wherein the operation of generating comprises:

applying the adjusted window size to a transport level of the receive node in the subsequent control interval.

23. The computer program product of claim 17 the computer process further comprises:

communicating the adjusted receive window size to the first node to instruct the first node to adjust a send window size in accordance with the receive window and to transmit to the second node in accordance with the adjusted receive window size in the subsequent control interval.

24. The computer program product of claim 17 wherein the operation of evaluating comprises:

detecting a loss of the transfer data received by the second node during the specified control interval, relative to the specified receive window.

25. The computer program product of claim 17 wherein the operation of evaluating comprises:

measuring an amount of the transfer data received by the second node during the specified control interval.

26. The computer program product of claim 17 wherein the operation of generating comprises:

determining whether to increase or decrease the receive window to obtain the adjusted receive window size; and

determining an amount by which to adjust the receive window to obtain the adjusted receive window size.

27. The computer program product of claim 17 wherein the operation of generating comprises:

determining an amount by which to adjust the receive window using a binary search to obtain the adjusted receive window size.

28. The computer program product of claim 17 wherein the operation of generating comprises:

determining an amount by which to adjust the receive window using a stochastic approximation to obtain the adjusted receive window size.

29. The computer program product of claim 17 wherein the operation of generating comprises:

evaluating a measured amount of the transfer data received by the receiver node during the specified control interval relative to the specified received window size to determine a slope for the specified control interval; and

testing the slope for the specified control interval against an estimate of a constant slope associated with additional available network capacity in at least one previous control interval.

30. The computer program product of claim 17, wherein the operation of generating comprises:

evaluating a measured amount of the transfer data received by the receiver node during the specified control interval relative to the specified received window size to determine a slope for the specified control interval; and

testing the slope for the specified control interval against an estimate of a constant slope associated with additional available network capacity in at least one previous control interval in the presence of a measurement noise threshold.

31. The computer program product of claim 17 wherein the operation of generating comprises:

evaluating a measured amount of the transfer data received by the receiver node during the specified control interval relative to the specified received window size to determine a slope for the specified control interval; and

testing the slope for the specified control interval against an estimate of a constant slope associated with additional available network capacity in at least one previous control interval, wherein the estimate of the constant slope represents a weighted average of at least one previous slopes associated with at least one previous control interval in which the previous slope exceeds or equals a previous estimate of the constant slope.

32. The computer program product of claim 17 wherein the operations of evaluating and generating are performed at the application level.

33. A system comprising:

an estimating module evaluating network capacity available for communications between a first node and a second node based on transfer data received by the second node from the first node within a specified receive window during a specified control interval; and

an adjusting module generating an adjusted receive window size for a subsequent control interval based on evaluated availability of the network capacity in the specified control interval.

34. The system of claim 33 further comprising:

a communication module communicating the adjusted receive window size to the first node to instruct the first node to transmit to the second node in accordance with the adjusted receive window size in the subsequent control interval.

35. The system of claim 33 wherein the adjusting module adjusts a receive buffer size at the second node at an application level to generate the adjusted window size in the subsequent control interval.

36. The system of claim 33 wherein the adjusting module adjusts a receive buffer size at the second node to generate the adjusted window size in the subsequent control interval.

37. The system of claim 33 wherein the adjusting module applies the adjusted window size to a transport level of the receive node in the subsequent control interval.

38. The system of claim 33 wherein the adjusting module applies the adjusted window size to a transport level of the receive node in the subsequent control interval.

39. The system of claim 33 further comprising:

a communications module communicates the adjusted receive window size to the first node to instruct the first node to adjust a send window size in accordance with the receive window and transmits to the second node in accordance with the adjusted receive window size in the subsequent control interval.

40. The system of claim 33 wherein the estimating module detects a loss of the transfer data received by the second node during the specified control interval, relative to the specified receive window.

41. The system of claim 33 wherein the estimating module measures an amount of the transfer data received by the second node during the specified control interval.

42. The system of claim 33 wherein the adjusting module determines whether to increase or decrease the receive window to obtain the adjusted receive window size and determines an amount by which to adjust the receive window to obtain the adjusted receive window size.

43. The system of claim 33 wherein adjusting module determines an amount by which to adjust the receive window using a binary search to obtain the adjusted receive window size.

44. The system of claim 33 wherein the adjusting module determines an amount by which to adjust the receive window using a stochastic approximation to obtain the adjusted receive window size.

45. The system of claim 33 wherein the adjusting module evaluates a measured amount of the transfer data received by the receiver node during the specified control interval relative to the specified received window size to determine a slope for the specified control interval; and

testing the slope for the specified control interval against an estimate of a constant slope associated with additional available network capacity in at least one previous control interval.

46. The system of claim 33 wherein the adjusting module evaluates a measured amount of the transfer data received by the receiver node during the specified control interval relative to the specified received window size to determine a slope for the specified control interval and tests the slope for the specified control interval against an estimate of a constant slope associated with additional available network capacity in at least one previous control interval in the presence of a measurement noise threshold.

47. The system of claim 33 wherein adjusting module evaluates a measured amount of the transfer data received by the receiver node during the specified control interval relative to the specified received window size to determine a slope for the specified control interval and tests the slope for the specified control interval against an estimate of a constant slope associated with additional available network capacity in at least one previous control interval, wherein the estimate of

the constant slope represents a weighted average of at least one previous slopes associated with at least one previous control interval in which the previous slope exceeds or equals a previous estimate of the constant slope.

48. The system of claim 33 wherein the estimating module and the adjusting module operate at the application level.